

Stock assessment and restoration of the Afognak Lake sockeye salmon run

Abstract: The Afognak Lake sockeye salmon *Oncorhynchus nerka* runs were extremely weak in 2001 and 2002. Spawning escapement goals to the system were not achieved, and the Afognak Bay subsistence fishery was closed in 2002. In response to poor runs and concerns of the local subsistence users, the Alaska Department of Fish and Game conducted a one year feasibility study during 2003, through the Fisheries Resource Monitoring Program, to estimate smolt abundance and determine biological characteristics and the timing of the emigration.

A total of 82,970 sockeye salmon smolt were captured using a floating incline plane trap and then a Canadian fan trap operated from 12 May to 3 July 2003. Using mark-recapture techniques and a variation of the stratified Peterson estimator, we estimated that 564,793 sockeye salmon smolt (95% C.I. 374,814 - 754,772) emigrated from Afognak Lake in 2003. The emigration was composed of 373,513 age-1. and 191,279 age-2. smolt. Age-1. smolt had a mean weight of 4.1 g, a mean length of 79.1 mm, and a mean condition factor of 0.82. Age-2. smolt had a mean weight of 4.2 g, a mean length of 81.4 mm, and a mean condition factor of 0.77. Age-2. smolt were most abundant during the first two weeks (12-25 May) of the emigration, whereas age-1. smolt was the predominant age class from 1 June to 3 July. Results demonstrated that mark-recapture techniques are a feasible method to estimate Afognak Lake sockeye salmon smolt abundance. Afognak Lake smolt age-at-emigration, size, and emigration timing in 2003 appear to be “typical” for this and other populations within this geographic region. Based on these data, lake rearing conditions have probably improved. Projected adult returns from the 2003 smolt emigration suggest that, beginning in 2005, runs should be larger than those experienced in 2001 and 2002.

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